

UCMR Overview

Georgia EPD Laboratory

UCMR Rule

- **1996 amendment to SDWA.**
- **Requires EPA to establish a monitoring plan for unregulated contaminants.**
- **Data collected will be used to evaluate and prioritize contaminants for inclusion in new drinking water standards.**
- **Provide for a scientific basis for adding contaminants to the contaminant list.**

What Does the Rule Require?

- **A new list of contaminants to monitor for:**
 - **List 1, assessment monitoring.**
75 large systems, 22 small systems.
 - **List 2, screening surveys.**
2 large systems, 6 small systems
 - **List 3, pre-screening testing.**
Water systems not yet identified.

Monitoring Requirements

- **Surface water systems.**
 - Quarterly for 1 year with one sample collected during May to July.
- **Groundwater systems.**
 - Monitor two times during a 1 year period.

List 1 Monitoring

- EPTC
- 2,6-Dinitrotoluene
- 2,4-Dinitrotoluene
- Molinate
- Terbacil
- Acetochlor
- 4,4-DDE
- MTBE
- Nitrobenzene
- DCPA mono & di acid
- Perchlorate

What Are These Compounds

- **2,4 and 2, 6 –dinitrotoluene**
 - Used in the production of isocyanate & explosives.
- **Acetochlor, EPTC, Molinate, Terbacil, DCPA**
 - Selective Herbicides
- **4,4-DDE**
 - Degradation product of DDT

What Are These Compounds, Cont.

- **MTBE**

- Oxygen enhancer in unleaded gasoline.

- **Perchlorate**

- Oxygen additive in solid rocket fuel.

- **Nitrobenzene**

- Used in the production aniline which is used in the production of dyes, herbicides & drugs

List 2 Monitoring

- **No chemical monitoring for Georgia.**
- **Aeromonas monitoring for 2 large systems and 6 small systems.**
- **2 large systems – St. Simons and City of Thomasville and 6 small systems.**

What Does the Rule Require?

Cont.

- **Required analytical methods for listed contaminants.**
- **New data reporting and approval requirements for the EPD Laboratory and Public Water Systems.**

What's Different About Data Reporting?

- Data is reported electronically directly to EPA CDX data base by the EPD Laboratory.
- Data approval by the Water System.
- Positive results from monitoring must be reported on the CCR.

Electronic Data Reporting, What's Required?

- **Specific data format.**
- **Specific data items.**
- **Quality control results for precision and accuracy.**
- **Approval of data by Laboratory.**
- **Electronic approval of entered data by water system at the CDX web site.**

Data Approval by Water Systems

- **When a hard copy report is received, you need to log into the UCMR/CDX web site and approve your data to avoid failure to monitor violations.**
- **If you receive a report and the the data is not in the data base-**
 - **Make sure the entry point is in your inventory.**
 - **Contact David Jones at the EPD Laboratory; the data will be re-exported.**

Establishing a UCMR/CDX Account

- **Register for an account at:**
 - https://cdx.epa.gov/epa_home.asp
 - Internet Explorer 5.5 required
- **Fax a sponsor letter to:**
 - 301-429-3905
 - Wait

Water Systems With Unapproved Data in SDWARS

- Tifton 2770001
- Moultrie 0710004
- Thomasville 2750005
- Bainbridge 0870001
- Bartow Co. 150001
- Chatsworth 2130000
- Powder Springs 0670006
- Occ. Co. Watkinsville 2190000
- Warner Robins 1530007
- Valdosta 1850002
- Brunswick 1270000
- Hinesville 1790000
- Statesboro 0310004
- Houst.Co/Feagin 153021
- Vidalia 2790002
- Kingsland 0390000
- Waycross 2990002
- Cumming 1170000
- Ft. Stewart 1790024
- Walker Co. 2950003

Contact:

David Jones- 404-206-5246

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Questions?

Comments?

[Next Presentation](#)

Stage 1 Disinfectants and Disinfection Byproducts Rule

Organic Laboratory

Carmen Jones

Stage 1 DBPR

- **Stage 1 Disinfectants and Disinfection Byproducts Rule (Stage 1 DBPR)**
- **December 16, 1998**
- **The purpose of this rule is to improve public health protection by balancing the risks between microbial pathogens and disinfection byproducts.**

Stage 1 DBPR

- **Some disinfectants and disinfection byproducts (DBPs) have been shown to cause cancer and adverse reproductive or developmental effects in lab animals. Plus it is suggested that they may cause bladder cancer and adverse reproductive effects in humans.**

Stage 1 DBPR

- **Stage 1 DBPR applies to all sizes of community water systems and nontransient noncommunity water systems that add a disinfectant to the drinking water during any part of the treatment process and transient noncommunity water systems that use chlorine dioxide.**

Stage 1 DBPR

- **Updates and supersedes the 1979 regulation for total trihalomethanes.**
- **Establishes maximum contaminant level goals (MCLGs) and maximum contaminant levels (MCLs) for total trihalomethanes (TTHMs), haloacetic acids (HAA5), chlorite and bromate.**
- **Reduces exposure to three disinfectants and many disinfection byproducts.**
- **Establishes maximum residual disinfectant level goals (MRDLGs) and maximum residual disinfectant levels (MRDLs) for three chemical disinfectants – chlorine, chloramine, and chlorine dioxide.**
- **Establishes percentages of organic materials, measured as total organic carbon (TOC), to be removed from surface water systems or ground water under the direct influence of surface water (GWUDI) systems using conventional filtration treatment.**

Stage 1 DBPR – MRDLGs and MRDLs

Disinfectant Residual	MRDLG (mg/L)	MRDL (mg/L)	Compliance Based On
Chlorine	4 (as Cl ₂)	4.0 (as Cl ₂)	Annual Average
Chloramine	4 (as Cl ₂)	4.0 (as Cl ₂)	Annual Average
Chlorine Dioxide	0.8 (as ClO ₂)	0.8 (as ClO ₂)	Daily Samples

Stage 1 DBPR – Revised MCLGs and MCLs

Disinfection Byproducts	MCLG (mg/L)	MCL (mg/L)	Compliance Based On
Total Trihalomethanes (TTHM) - Chloroform - Bromodichloromethane - Dibromochloromethane - Bromoform	N/A N/A Zero 0.06 Zero	0.080	Annual Average
Haloacetic acids (HAA5) - Dichloroacetic acid - Trichloroacetic acid	N/A Zero 0.3	0.060	Annual Average
Chlorite	0.8	1.0	Monthly Average
Bromate	Zero	0.010	Annual Average

Stage 1 DBPR – TOC Removal

Source Water TOC (mg/L)	Source Water Alkalinity (mg/L as CaCo3)		
	0 - 60	>60 - 120	>120
>2.0 – 4.0	35.0%	25.0%	15.0%
>4.0 – 8.0	45.0%	35.0%	25.0%
>8.0	50.0%	40.0%	30.0%

*Systems meeting at least one of the alternative compliance criteria in the rule are not required to meet the removals in this table.

*Systems practicing softening must meet the TOC removal requirements in the last column to the right.

Stage 1 DBPR - Monitoring

- **January 1, 2002 – Surface water systems and ground water systems under the direct influence of surface water (GWUDI) serving $\geq 10,000$ people must comply with the Stage 1 DBPR requirements.**
- **January 1, 2004 – Surface water systems and ground water systems under the direct influence of surface water (GWUDI) serving $< 10,000$ and all ground water systems must comply with the Stage 1 DBPR requirements.**

TTHM/HAA5 Routine Monitoring Requirements

System Type	Frequency	Location
Surface and GWUDI serving $\geq 10,000$	4/plant/quarter	25% Max. Residence Time (RT) 75% Rep.
Surface and GWUDI serving 500 – 9,999	1/plant/quarter	Max. RT
Surface and GWUDI serving <500	1/plant/year in month of warmest water temperature*	Max. RT
Ground water serving $\geq 10,000$	1/plant/quarter	Max. RT
Ground water serving $<10,000$	1/plant/year in month of warmest water temperature*	Max. RT

*System must increase monitoring to 1 sample per plant per quarter if a MCL is exceeded.

Stage 1 Reduced Monitoring

System Type	Conditions	Frequency
Surface and GWUDI serving $\geq 10,000$	$\leq 50\%$ of MCLs TOC ≤ 4.0 mg/L	1/plant/quarter at Max RT
Surface and GWUDI serving 500 – 9,999	$\leq 50\%$ of MCLs TOC ≤ 4.0 mg/L	1/plant/year in month of warmest water temp. Max RT
Surface and GWUDI serving < 500	No Reduced Monitoring	
Ground water serving $\geq 10,000$	$\leq 50\%$ of MCLs	1/plant/year In month of warmest water temp. Max RT
Ground water serving $< 10,000$	$\leq 50\%$ of MCLs (2 years) or $\leq 25\%$ of MCLs (1 year)	1/plant/3years In month of warmest water temp. Max RT

Sample Scheduling

- We ship about 80 – 100 Entry points per week beginning the 1st week of each quarter (20 or less systems per week) in numerical order of the system ID numbers.
- We would like for samples to be taken within a week after receipt of bottles to help ensure a steady flow of samples within the laboratory. But we can be flexible.
- Best to ship on Monday - Thursday to ensure receipt by lab.

Sampling Kits, Documentation, Shipping Requirements

- **Sampling kit:**

- One cooler for THMs
- One cooler for HAAs
- Two vials per Entry Point
- Plus extra vials for Laboratory Matrix Spike
- Fill all vials completely but not to overflowing



- Two sampling forms per Entry Point must be completed
- Samples must be kept cold 4° C from collection until receipt by laboratory. Shipped Monday - Thursday by overnight carrier.

Analytical Method

- **Approved Methodology**

THMs – EPA Method 551.1

Determination of Chlorination Disinfection Byproducts in Drinking Water by Liquid-Liquid Extraction and Gas Chromatography with Electron-Capture Detection

HAAs – EPA Method 552.2

Determination of Haloacetic acids and Dalapon in Drinking Water by Liquid-Liquid Extraction and Gas Chromatography with Electron Capture Detection



THM/HAA Audit Results

THMs						
Analyte	Units	Reported Value	Assigned Value	Acceptance Limits	Performance Evaluation	Method
Chloroform	ug/L	41.7	45.2	36.2 - 54.2	Acceptable	551.1
Bromodichloromethane	ug/L	5.40	4.76	2.86 - 6.66	Acceptable	551.1
Chlorodibromomethane	ug/L	21.5	23.9	19.1 - 28.7	Acceptable	551.1
Bromoform	ug/L	34.4	33.2	26.6 - 39.8	Acceptable	551.1
Total Trihalomethanes	ug/L	103	107	85.6 - 128	Acceptable	551.1
HAAs						
Chloroacetic acid	ug/L	8.75	9.05	2.72 - 14.5	Acceptable	552.2
Bromoacetic acid	ug/L	11.8	11.9	4.88 - 17.2	Acceptable	552.2
Dichloroacetic acid	ug/L	32.3	33.9	15.5 - 37.8	Acceptable	552.2
Trichloroacetic acid	ug/L	24.3	26.0	10.4 - 34.9	Acceptable	552.2
Dibromoacetic acid	ug/L	10.7	13.7	6.67 - 18.8	Acceptable	552.2

Stage 2 DBPR



- **LRAA instead of RAA**

Reporting

- Reports are sent to the water systems and to Onder Serefli within about 4 weeks after the laboratory receives your samples.
- QC surrogates are listed on the reports. Surrogates are used by the laboratory to track the efficiency of the extraction of the samples. They are not to be included in the TTHMs or HAA5 averages.

THMs – Decafluorobiphenyl SS

HAAs – SS – 2-BPA

Sampling Concerns and Questions

- **Samples must be packed with enough ice to maintain 4° C during shipping.**
- **Questions/comments?**

Staff Contacts

- **Carmen Jones**
- **Office Phone: 404-206-5265**
- **Fax: 404-206-5268**
- **Email: carmen_jones@dnr.state.ga.us**

- **For More Information:**
 - www.epa.gov/safewater/mdbp/implement.html**
 - www.epa.gov/safewater/standards.html**
 - EPA's Safe Drinking Water Hotline: 1-800-426-4791**

Coordinating Sample Analysis With the Georgia EPD Laboratory

Microbiology Laboratory

Viola Reynolds

EPA Safe Drinking Water Rule

Bacteriology Laboratory

- Total Coliform Rule (TCR)
- December 31, 1990
- Based on the presence or absence of coliform bacteria rather than on the number of coliforms detected in the samples.
- Coliform positive samples must be further tested for fecal coliform (or E. coli).

EPA Safe Drinking Water Rule

Protozoan Laboratory

- **Safe Drinking Water Act Amendment**
- **December, 1996**
- **Raw surface waters used as source waters for drinking water treatment plants must be assessed for *Cryptosporidium* and *Giardia* occurrence.**

Sample Scheduling

- **TCR:** The number of samples that must be taken monthly is based on the population served by the water system.
- For each routine sample that is total coliform-positive, a system must collect a set of repeat samples preferably within 24 hours of notification.
- If total coliforms are detected in any routine sample, the system must collect five routine samples the next month.

Sample Scheduling

- **Protozoan:**
- **Source water samples are scheduled by Drinking Water Program**

Sampling Kits

- Drinking Water (Bac-T) Sampling Kit
- Black Fiber Case
- 250 ml or 125 ml sterile round bottle with sodium thiosulfate added.
- Instruction sheet and ID form



Protozoan Sampling Kits

- Cooler
- Ice packs
- 10 Liter Cubitainer
- Instruction sheet
- Lab Sample Form
- Chain of Custody Form



Sampling Kits, Documentation, Shipping Requirements

Shipping requirements:

- Next Day Shipping
- For Drinking Water Samples - Time from sample collection to initiation of analysis for total and fecal coliform (*E. coli*) cannot exceed 30 hours.
- For Protozoan samples – Sample filtration must be initiated within 96 hours of collection.
 - Samples must be maintained at 0-8 C.

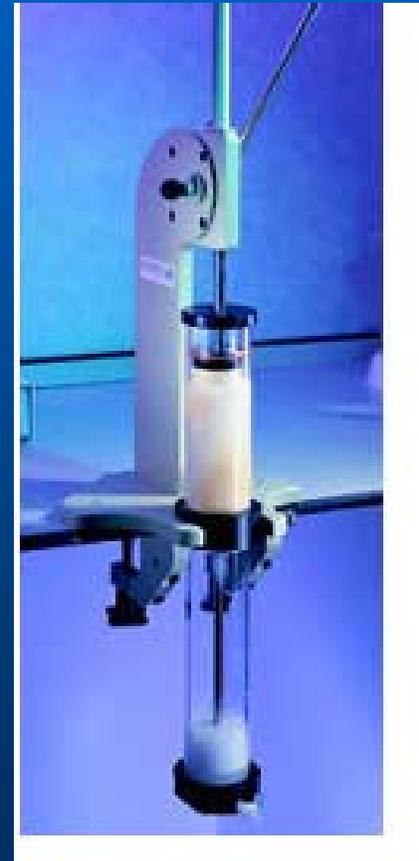
Analytical Method

- **Drinking Water
Samples - SM 9223
P/A (Colilert)**



Analytical Method

- Protozoan samples
EPA Method 1623



Reporting

- **Report information:**
- **Collection Information**
- **Results**
- **Reporting Limits**
- **Turnaround time for reports is 2-3 weeks.**

Sampling Concerns and Questions

- Questions/comments?

Staff Contacts

- **Viola Reynolds, Microbiology Laboratory Program Manager - 404 206-5210**
- **Mary Lewis or Avionne Fortner, Bacteriology Laboratory Supervisors - 404-206-5211**
- **Myrna Finch, Protozoan Laboratory Supervisor - 404-206-5212**
- **Email: viola_reynolds@dnr.state.ga.us**

Coordinating Sample Analysis With the Georgia EPD Laboratory

Metals Lab

Mark Tolbert

EPA Safe Drinking Water Rule

Control of Copper and Lead

- Required starting 1992
- 1 liter sample required

Inorganic Chemicals

- Required starting 1992
- 250 mL sample required

Sample Scheduling

Lead and Copper

- Two consecutive six month monitoring periods collected from the full number of sites.
- Three consecutive years collected from half the original number of sites with a minimum of 5 sites sampled. Samples must be collected in June, July, August or September and be from the original pool of collection sites.
- Half the original number of samples collected once in a three year period. Samples must be collected in June, July, August, or September and be from the original pool of collection sites.
- If the action level for either Copper or Lead is exceeded the schedule is reset to full monitoring.

Sample Scheduling

Inorganic Chemicals (IOC)

- Groundwater systems collect one sample from each distribution point once every three years.
- Surface water systems collect one sample from each distribution point once a year.
- An distribution point that mixes groundwater and surface water is sampled as surface water.

Copper and Lead Kit

Between 5 and 100 1 liter bottles each uniquely identified by a barcode.

Sample kits include the final target site list, survey of materials summary, a ninetieth percentile form and a collection form for each bottle.



IOC Kit

One 250 ml bottle per distribution point.

Sample kits include a Styrofoam box with a cold pack and a collection form pre-printed with the system information.



Analysis

Copper and Lead:

- EPA method 200.8, ICP Mass Spectrometry.

IOC:

- 245.1: Mercury by Cold Vapor Atomic Absorption.
- 200.7: ICP Atomic Emission Spectroscopy: Aluminum, Barium, Chromium, Iron, Manganese, Sodium, Nickel, Zinc.
- 200.8: ICP Mass Spectrometry: Beryllium, Arsenic, Selenium, Cadmium, Antimony, Thallium.

ICP Mass Spectrometer



ICP Atomic Emission Spectrometer



Mercury



Reporting

- **Copper and Lead**
- **Standard lab report with wording describing ways to reduce copper and lead in drinking water.**

IOC

- **Standard lab report**

Sampling Concerns and Questions

Common errors

- Less than 6 hours between the time water was last used and the collection time.
- Unsigned sample forms.
- No sample sites on the bottles or forms.
- Missing forms or bottles.

Questions/comments?

Staff Contacts

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TOC and Nitrate/Nitrite Sample Analysis With the Georgia EPD Laboratory

Inorganic Laboratory
Laboratory Manager
Pat Sammons

EPA Safe Drinking Water Rule

- **Stage 1 Disinfection Byproducts Rule for TOC**
 - Promulgated 1998
- **TOCs are paired (raw and filtered) once per month.**
- **Phase 2 Safe Drinking Water Act for Nitrate/Nitrite**
 - Promulgated 1993
- **Nitrate/Nitrite once annually unless result exceeds 5.0 mg/L then once per quarter for 4 consecutive quarters**

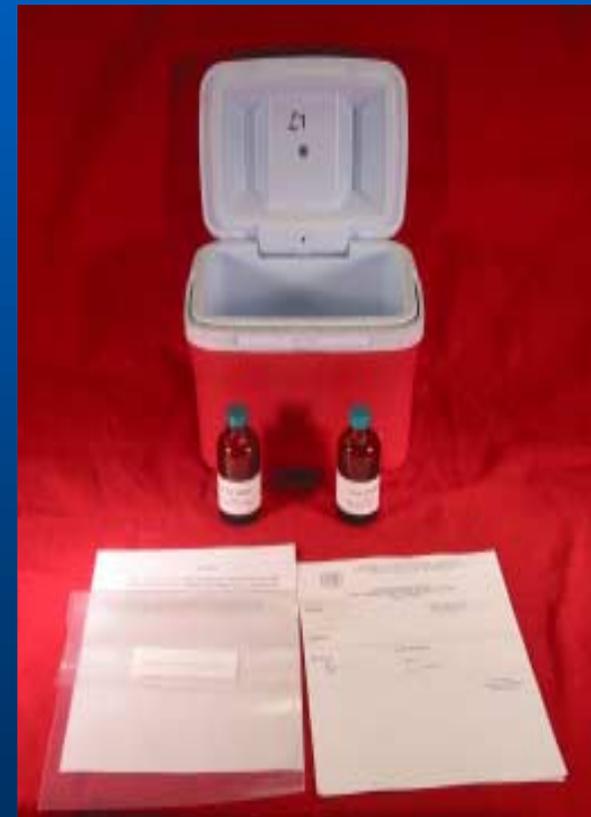
Sampling Kits, Documentation, Shipping Requirements For NO₃

- Documentation includes WSID and Entry Point. Sample collector will fill out Date and Time collected and Collector's Name.
- Nitrate/Nitrites require Chlorination Status to be filled out by collector. Nitrate/Nitrites are shipped with a cold pack that requires freezing prior to sample return.



Sampling Kits, Documentation, Shipping Requirements For TOC

- Documentation includes WSID and Entry Point. Sample collector will fill out Date and Time collected and Collector's Name.
- TOCs require a field alkalinity on Raw samples. TOCs are preserved with dilute acid and are required to be returned on ice via overnight carrier.



Analytical Method

- Nitrate/Nitrite EPA Method 353.2
Cadmium
Reduction using
Traacs 800
Autoanalyzer.



Analytical Method

- **TOCs SM5310C
Persulfate/Ultraviolet
Oxidation Using
Tekmar-Dohrmann
Phoenix 8000**



Reporting

- **Maximum Contaminant Level (MCL) for Nitrate/Nitrite is 10 mg/L.**
- **Average turnaround time for TOC and Nitrate/Nitrite is 2 weeks.**

Sampling Concerns and Questions

- Questions/comments?

Staff Contacts

- **Kristy Hrehor 404-206-5238**
- **khrehor@dnr.state.ga.us**
- **Pat Sammons 404-206-5239**
- **psammons@dnr.state.ga.us**

- [SOC Presentation](#)

Coordinating Sample Analysis With the Georgia EPD Laboratory

Organic Chemistry

Danny Reed

EPA Safe Drinking Water Rule

- **Synthetic Organic Chemicals(SOC)**
- **Phase 2 and Phase 5 Amendments to 1986 Safe Drinking Water Act**
- **Phase 2 and Phase 5 – 1991 Promulgation**
- **4 consecutive quarters of testing to establish a baseline. No MCL violations – eligible for waiver**

Sample Scheduling

- **Each entry point sampled for 4 consecutive quarters to be eligible for waivers.**
- **Samples collected by Georgia Rural Water and delivered to Laboratory.**

Sampling Kits, Documentation, Shipping Requirements

- **Sampling kit:**
Complete enclosed paperwork giving collection date, time, location, and entry point
- **Collected by Rural Water**



- EPA Methods 504.1, 508.1, 515.1, 525.2, 547, 548.1, and 549.2
- Analyses performed by gas or liquid chromatographs



EPA Methods 504.1 & 508.1

504.1

EDB

DBCP

508.1

Chlordane

Toxaphene

PCBs

EPA Method 515.1

Dalapon

Dicamba

2,4-D

Silvex

Dinoseb

Picloram

EPA Method 525.2

Hexachlorocyclopentadiene

Propachlor

Hexachlorobenzene

Simazine

Atrazine

Pentachlorophenol

Lindane

Heptachlor

Heptachlor Epoxide

Metribuzin

Alachlor

Metolachlor

Aldrin

g-Chlordane

a-Chlordane

Butachlor

trans-Nonachlor

Dieldrin

Endrin

Di(2-ethylhexyl)adipate

Methoxychlor

Di(2-ethylhexyl)phthalate

Benzo(a)pyrene

EPA Method 531.1

Aldicarb

Aldicarb Sulfoxide

Aldicarb Sulfone

Oxamyl

Methomyl

3-Hydroxycarbofuran

Carbofuran

Baygon

Carbaryl

Methiocarb

EPA Methods 547, 548.1, 549.2

547

Glyphosate

548.1

Endothall

549.2

Diquat

Reporting

- Report information includes analyte, concentration, MCL, sampling location, and date of analysis
- QC surrogate
- Turnaround typically 3 weeks

Sampling Concerns and Questions

Questions/comments?

Staff Contacts

- **Danny Reed 404-206-5252**
- **Rick Nelson 404-206-5255**
- **Email address**
- **danny_reed@dnr.state.ga.us**

- [Volatile Organics Presentation](#)

Coordinating Sample Analysis With the Georgia EPD Laboratory

GC-Mass Spec. Laboratory

Steve Bryan

Volatile Organic Contaminant

VOC

EPA Safe Drinking Water Rule

Safe Drinking Water Act (1974)

1986 Amendments for Regulated VOCs:

Phase I 1989

8 VOCs

- Benzene
- Carbon tetrachloride
- 1,2-Dichloroethane
- 1,1-Dichloroethylene
- p-Dichlorobenzene
- 1,1,1-Trichloroethane
- Trichloroethylene
- Vinyl chloride

EPA Safe Drinking Water Rule

Phase II 1992

10 VOCs

- o-Dichlorobenzene
- cis-1,2-Dichloroethylene
- trans-1,2-Dichloroethylene
- 1,2-Dichloropropane
- Ethylbenzene
- Chlorobenzene
- Styrene
- Tetrachloroethylene
- Toluene
- Xylenes (Total)

EPA Safe Drinking Water Rule

Phase V 1994

3 VOCs

- Dichloromethane
- 1,1,2-Trichloroethane
- 1,2,4-Trichlorobenzene

Sample Scheduling

- **Base Requirements**
 - 4 Consecutive Quarterly Samples
- **Reduced Monitoring – No Previous Detects**
 - **Surface Water Systems**
 - 1 Sample Every Year
 - **Ground Water Systems**
 - 1 Sample Every 3 Years
- **No Volatile Organic Contaminant Waivers**
- **Detects – Positive Regulated Compound**
 - **Confirmation Sample Sent**
 - **Confirmed**
 - **Move to Quarterly Sampling**

Sampling Kits, Documentation, Shipping Requirements

- **VOC Sampling kit:**
 - 1-125ml Brown Round Bottom¹
 - 2-40ml Clear Vials²
 - 1-EPD Travel Blank³
- **Shipping Requirements**
 - Complete Sampling Form
 - Follow enclosed instructions
 - Bag must be completely filled with ice
 - Next day shipping
 - Ship Monday through Thursday



Analytical Method

- EPA Method 524.2
- Agilent[®] GC-Mass Spectrometer
- Tekmar[®] and Archon[®]



Reporting

- **Final Report**

- **First page “Regulated Compounds”**

- Far Right “MCL” or Maximum Contamination Level
 - QC Surrogate Compounds
 - Laboratory Quality Control
 - Acceptable limits on far right

- **Second page “Unregulated Compounds”**

- THM Compounds
 - Not regulated utilizing this methodology
 - Preservation method can form THMs
 - Methoxy-2-methyl-propane – MtBE
 - Oxygenate – Gasoline Additive

Sampling Concerns and Questions

- Questions/comments?

Staff Contacts

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